What is claimed is:

1. A microcapsule having an average diameter of about 2000μ or less comprising an inorganic antimicrobial agent encapsulated within a hydrophilic polymer.

2. A microcapsule according to claim 1 wherein the inorganic antimicrobial agent comprises a metal or metal ion selected from the group consisting of silver, copper, zinc, tin, gold, mercury, lead, iron, cobalt, nickel, manganese, arsenic, antimony, bismuth, barium, cadmium, chromium, thallium and combinations thereof.

3. A microcapsule according to claim 2 wherein the antimicrobial metal or metal ion is silver, zinc, copper or a combination of any two or all three of the foregoing.

4. A microcapsule according to claim 1 wherein the antimicrobial agent is selected from the group consisting of metal salts, antimicrobial water soluble glasses, antimicrobial metal ion-exchange type agents and combinations thereof.

5. A microcapsule according to claim 4 wherein the antimicrobial agent is an antimicrobial metal ion-exchange type agent comprising a ceramic carrier having ion-exchanged antimicrobial metal ions.

6. A microcapsule according to claim 5 wherein the ceramic carrier is selected from the group consisting of zeolites, hydroxyapatites, and zirconium phosphates.

7. A microcapsule according to claim 6 wherein the antimicrobial agent is a zeolite that contains silver ions.

8. A microcapsule according to claim 1 wherein the hydrophilic polymer is a polymer with water absorption at equilibrium of at least about 2% by weight.

9. A microcapsule according to claim 7 wherein the hydrophilic polymer is a polymer with water absorption at equilibrium of at least about 5% by weight.

10. A microcapsule according to claim 8 wherein the hydrophilic polymer is a polymer with water absorption at equilibrium of at least about 20% by weight.

11. A microcapsule according to claim 8 wherein the hydrophilic polymer is selected from the group consisting of polyhydroxyethyl methacrylate, polyacrylamide, N–vinyl-2-pyrrolidinone, polysaccharides, polylactic acid, polyamide and polyurethane.

12. A microcapsule according to claim 11 wherein the hydrophilic polymer is polyurethane.

13. A microcapsule according to claim 1 wherein the microcapsule contains from 1 to 1000 parts by weight of antimicrobial agent based upon 100 parts by weight of hydrophilic polymer.

14. A microcapsule according to claim 1 wherein the microcapsule contains from 10 to 200 parts by weight of antimicrobial agent based upon 100 parts by weight of hydrophilic polymer.

15. A microcapsule according to claim 1 wherein the microcapsule contains from 20 to 100 parts by weight of antimicrobial agent based upon 100 parts by weight of hydrophilic polymer.

16. A microcapsule according to claim 1 further comprises an inorganic discoloration inhibiting agent.

17. A microcapsule according to claim 16 wherein said discoloration inhibiting agent is an ammonium compound.

18. A microcapsule according to claim 16 wherein the antimicrobial agent comprises an ion-exchange type antimicrobial agent and said inorganic discoloration inhibiting agent comprises ion-exchanged ammonium ions contained within said antimicrobial agent.

19. A microcapsule according to claim 1 further comprising a dopant agent.

20. A microcapsule according to claim 19, wherein said dopant is an inorganic sodium salt.

21. A microcapsule according to claim 20, wherein said dopant is sodium nitrate.

22. A microcapsule according to claim 1 wherein the microcapsule comprises a discrete particle of an antimicrobial agent encapsulated within a hydrophilic polymer.

23. A microcapsule according to claim 1 wherein the microcapsule comprises multiple particles of one or more antimicrobial agents encapsulated within a hydrophilic polymer.

24. A method for manufacture of a microcapsule comprising:

(a) dissolving a hydrophilic polymer in a solvent

(b) adding an antimicrobial agent to form a mixture

(c) combining said mixture with an antisolvent to precipitate a microcapsule containing the antimicrobial agent

(d) separating the microcapsule from the liquid and

(e) drying the microcapsule

25. The method for manufacture of a microcapsule according to claim 24 wherein the antimicrobial agent is a zeolite containing silver.

26. A method for manufacture of a microcapsule comprising:

(a) mixing an antimicrobial agent with one or more polymer precursors to obtain an antimicrobial agent coated with the polymer precursor and

(b) effecting cure of the polymer precursor coating the antimicrobial agent.

27. The method of claim 26 wherein cure of the polymer precursor is attained by contacting the polymer precursor with an appropriate polymerization initiator, catalyst or combination of the foregoing, alone or in combination with one or more additional polymer precursors.

28. The method of claim 26 wherein cure of the polymer precursor is attained by contacting the polymer precursor with one or more additional, reactive polymer precursors.

29. The method of claim 28 wherein the reactive polymer precursor is a diisocyanate.

30. The method for manufacture of a microcapsule according to claim 26 wherein the antimicrobial agent that has been coated with a polymer precursor is suspended in a fluidized bed during cure.

31. The method for manufacture of microcapsule according to claim 26 wherein the polymer precursor is selected from the group consisting of polyols, polyamines, polyalcohol amines, polyether diols, polyether diamines and combinations of the foregoing.

32. The method for manufacture of microcapsule according to claim 26 wherein the antimicrobial agent is a zeolite containing silver.

33. A method for manufacture of a microcapsule comprising:

(a) melt compounding of an antimicrobial agent with an hydrophilic polymer

(b) grinding of the compounded product to the desired particle size.

34. The method for manufacture of a microcapsule according to claim 33 wherein the compound is cryogenically ground.

35. The method for manufacture of a microcapsule according to claim 33 wherein the grinding is done to give microcapsules of mean average particle size of from about 15 to about 1000 microns.

36. The method for manufacture of a microcapsule according to claim 33 wherein the grinding is done to give microcapsules of mean average particle size of from about 50 to about 300 microns.

37. The method for manufacture of a microcapsule according to claim 33 wherein the grinding is done to give microcapsules of mean average particle size of from about 90 to about 200 microns.

38. An polymer composition comprising the microcapsule of claim 1 and a matrix polymer wherein the microcapsule comprises a discrete phase within the matrix polymer.

39. The polymer composition of claim 38 wherein the matrix polymer is a condensation polymer or an addition polymer.

40. The polymer composition of claim 39 wherein the matrix polymer is an addition polymer selected from the group consisting of polypropylene, polyethylene, polystyrene, polyvinylchloride, ABS, SAN, epoxy resins and polytetrafluoroethylene.

41. The polymer composition of claim 39 wherein the matrix polymer is a condensation polymer selected from the group consisting of polyurethanes, polycarbonates, polyesters, polyamides, polyimides and silicone polymers.

42. The polymer composition of claim 38 wherein the matrix polymer is not a hydrophilic polymer.

43. The polymer composition of claim 38 wherein the matrix polymer is a hydrophilic polymer whose hydrophilic property is different from that of the hydrophilic polymer encapsulant used to make the microcapsule.

44. The polymer composition of claim 38 wherein the matrix polymer is a copolymer.

45. The polymer composition of claim 38 wherein the matrix polymer is a polymer blend.

46. A method of preparing an antimicrobial resin comprising incorporating an antimicrobial microcapsule according to claim 1 into a polymer matrix wherein the polymer matrix is not the same polymer as used to form the microcapsule.

47. The method of claim 46 wherein the microcapsule is melt blended with the polymer matrix material.

48. The method of claim 46 wherein the microcapsule is dry blended with a second polymer in powder form and powder coated onto a substrate.

49. A method of controlling the rate of release of an antimicrobial agent from a polymer matrix comprising forming a microcapsule comprising an antimicrobial agent encapsulated within a hydrophilic polymer of a given hydrophilic property which allows for the release of the antimicrobial agent at a given rate and incorporating the antimicrobial microcapsule into another polymer which is either non-hydrophilic or which has a different hydrophilic property.

50. A method of improving the antimicrobial properties of a non-hydrophilic polymer using a given amount of an antimicrobial agent comprising forming a microcapsule comprising the antimicrobial agent encapsulated within a hydrophilic and incorporating the antimicrobial microcapsule into the non-hydrophilic polymer to form an antimicrobial composition having improved antimicrobial performance as compared to a similar composition wherein the antimicrobial agent is directly incorporated into the non-hydrophilic polymer.